



Billing Code [6450-01-P]

DEPARTMENT OF ENERGY

Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington

AGENCY: Department of Energy.

ACTION: Record of Decision.

SUMMARY: This is the first in a series of Records of Decision (RODs) to be issued by the U.S. Department of Energy (DOE) pursuant to the *Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (TC&WM EIS, DOE/EIS-0391, December 2012)*. In this EIS, DOE considered alternatives for proposed actions in three major areas: (1) Storing, retrieving, and treating radioactive waste from 177 underground storage tanks (149 Single-Shell Tanks [SSTs] and 28 Double Shell Tanks [DSTs]) at Hanford, and closure of the 149 SSTs; (2) decommissioning of the Fast Flux Test Facility (FFTF) and its auxiliary facilities; and (3) continued and expanded waste management operations on site, including the disposal of Hanford's low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW), and limited volumes of LLW and MLLW from other DOE sites. The *Final TC&WM EIS* includes No Action alternatives to the proposed actions in each of the three major areas, as required under the National Environmental Policy Act (NEPA). DOE's decisions described herein pertain to all three major areas. DOE intends to issue subsequent RODs as identified under **"SUPPLEMENTARY INFORMATION."**

ADDRESSES: For copies of this ROD, the *Final TC&WM EIS*, or any related NEPA documents, please contact:

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This ROD and the *Final TC&WM EIS* are available on the DOE NEPA Web site at:

www.energy.gov/nepa and on the Hanford Web site at:

<http://www.hanford.gov/index.cfm?page=1117&>.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

Background

The Hanford site, located in southeastern Washington State along the Columbia River, is approximately 586 square miles in size. Hanford's mission from the early 1940s to approximately 1989 included defense-related nuclear research, development, and weapons production activities. These activities created a wide variety of chemical and radioactive wastes. Hanford's mission now is focused on the cleanup and remediation of those wastes and ultimate closure of the site. An important part of the mission includes the retrieval and treatment of waste from 177 underground radioactive waste storage tanks, including 149 SSTs and 28 DSTs, and closure of the SSTs. Hanford's mission also includes radioactive waste management on the site and decommissioning and closure of the FFTF, a nuclear test reactor that has been designated for closure (66 FR 7877, January 26, 2001).

The Final EIS implements the January 6, 2006, Settlement Agreement (as amended on June 5, 2008) signed by DOE, the Washington State Department of Ecology (Ecology), the Washington State Attorney General's Office, and the U.S. Department of Justice. That agreement settles NEPA claims made in the case *State of Washington v. Bodman* (Civil No. 2:03-cv-05018-AAM), which addressed the *Final Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement, Richland, Washington (HSW EIS, DOE/EIS-0286, February 13, 2004)*. The agreement also stipulates that the *TC&WM EIS* and its RODs supersede the *HSW EIS* and its ROD (69 FR 39449, June 30, 2004).

In addition, this *TC&WM EIS* ROD amends the 1997 *Tank Waste Remediation System ROD* (*TWRS* ROD, 62 FR 8693, February 26, 1997). Information on the 1997 *TWRS* ROD and three subsequent *TWRS EIS* Supplement Analyses¹ can be found in the *Final TC&WM EIS* (Chapter 1, Section 1.2.3). In the third *TWRS* Supplement Analysis, DOE determined that Phase I of the *TWRS* project, the initial demonstration facility, was not substantially different from the facilities identified in the Phased Implementation Alternative selected in the *TWRS EIS* ROD. The *TWRS* ROD is hereby amended, and the Phase II facility will not be constructed. The *TC&WM EIS* analysis of supplemental treatment capacity for low-activity waste (LAW) from chemical separation of the tank waste is consistent with the Phase I concept as stated in the *TWRS* ROD.

To support its decision making for the needed actions described below, DOE prepared the *TC&WM EIS* pursuant to NEPA and in accordance with the Council on Environmental Quality (CEQ) and DOE NEPA implementing regulations (40 CFR Parts 1500–1508; 10 CFR Part 1021). The Environmental Protection Agency (EPA) and Ecology were cooperating agencies on the *TC&WM EIS*. DOE held a public comment period on the *Draft TC&WM EIS*, extending from October 30, 2009, through May 3, 2010, with public hearings in Washington, Oregon, and Idaho. DOE considered all public comments received in preparing the *Final TC&WM EIS*, which was issued in December 2012 and includes DOE's responses to those comments.

¹DOE/EIS-0189-SA1 "Supplement Analysis for the Proposed Upgrades to the Tank Farm Ventilation, Instrumentation, and Electrical Systems under Project W-314 in Support of Tank Farm Restoration and Safe Operations" May 1997

DOE/EIS-0189-SA2 "Supplement Analysis for the Tank Waste Remediation System" May 1998

DOE/EIS-0189-SA3 "Supplement Analysis for the Tank Waste Remediation System" March 2001

In September 2013, DOE issued a *Draft Hanford Tank Waste Retrieval, Treatment, and Disposition Framework (Framework)*. The *Framework* is not a proposal or a decision document.

Purpose and Need for Agency Action

DOE needs to accomplish the following objectives:

- Safely retrieve and treat radioactive, hazardous, and mixed tank waste; close the SST system; and store and/or dispose of the waste generated from these activities. Further, DOE needs to treat the waste and close the SST system in a manner that complies with applicable Federal and Washington State laws and DOE directives to protect human health and the environment. Long-term actions are required to permanently reduce the risk to human health and the environment posed by waste in the 149 SSTs and 28 DSTs.
- Decommission FFTF and its support facilities at Hanford, manage waste associated with decommissioning the facilities, and manage disposition of the radioactively contaminated bulk sodium inventory at Hanford. These actions are necessary to facilitate cleanup at Hanford in compliance with Federal, state, and local laws and regulations.
- Expand or upgrade existing waste storage, treatment, and disposal capacity at Hanford to support ongoing and planned waste management activities for LLW and MLLW generated at Hanford and from other DOE sites; some tank waste; and FFTF decommissioning waste.

Alternatives Considered

Tank Closure

Under the Tank Closure Alternatives, DOE evaluated each of the primary tank closure components, specifically, storage, retrieval, treatment, and disposal of tank waste and closure of the SST system.

- **Alternative 1: No Action.** Alternative 1 is based on the No Action Alternative presented in the *TWRS EIS*, updated to reflect actions taken (interim stabilization of the SSTs) and new information developed since the *TWRS EIS* was issued, including additional consideration of the past leak inventory associated with the Hanford 200-East and 200-West Area tank farms.
- **Alternative 2: Implement the *TWRS EIS* ROD with Modifications.** Alternative 2 considers all vitrification treatment with retrieval of 99 percent of the waste from SSTs in accordance with the *TWRS EIS* ROD and the three supplement analyses completed through 2001. Two sub-alternatives were separately evaluated. Under Alternative 2A, waste would be treated using the existing Waste Treatment Plant (WTP) configuration, but the SST system would not be closed. Under Alternative 2B, WTP current configuration capacity for producing vitrified, i.e., immobilized, LAW glass (referred to herein as ILAW) from WTP would be expanded; technetium-99 would be removed from the WTP LAW stream during the pretreatment process² and the SST system would be closed as landfill closure under the Resource Conservation and Recovery Act (RCRA) and covered with an engineered, modified RCRA Subtitle C barrier, a multi-layer barrier designed to provide 500-year protection.

² Under Tank Closure Alternatives 2 through 6 and the sub-alternatives within them, the contents of the cesium (Cs) and strontium (Sr) capsules currently stored on site would be treated in the WTP.

- **Alternative 3: Existing WTP Vitrification with Supplemental Treatment**

Technology; Landfill Closure. Alternative 3 includes retrieval of 99 percent of the waste from SSTs. Under Alternative 3A, the waste would be treated using the existing WTP configuration supplemented with thermal treatment capacity (bulk vitrification). Under Tank Closure Alternative 3B, the waste would be treated using the existing WTP configuration supplemented with nonthermal treatment capacity (cast stone). Under Alternative 3B, technetium-99 would be removed from the LAW stream during pretreatment and incorporated into the high-level radioactive waste (HLW) stream for immobilization and off-site disposal. Under Alternative 3C, the waste would be treated using the existing WTP configuration supplemented with thermal treatment capacity (steam reforming). The SST system would be closed as a landfill and covered with an engineered modified RCRA Subtitle C barrier. There would be separate treatment of candidate tank mixed transuranic (TRU) waste³ under all three sub-alternatives, as described in the *TC&WM EIS*.

- **Alternative 4: Existing WTP Vitrification with Supplemental Treatment**

Technologies; Selective Clean Closure/Landfill Closure. Alternative 4 includes retrieval of 99.9 percent of the waste from SSTs. Waste would be treated using the existing WTP configuration supplemented with thermal treatment capacity (bulk vitrification) and nonthermal treatment capacity (cast stone). There would be separate treatment of the candidate tank mixed TRU waste, as described in the *TC&WM EIS*.

Under this alternative, technetium-99 removal would not occur as part of WTP

³ For Tank Closure Alternatives 3 through 5, the *TC&WM EIS* evaluated treatment of the tank waste stream associated with the candidate TRU waste as both TRU waste and HLW.

pretreatment. Tank farms BX and SX would be clean closed, which means the tanks, ancillary equipment, and contaminated soil would be removed, and the remaining tank farms would be closed as landfills and covered with an engineered modified RCRA Subtitle C barrier.

- **Alternative 5: Expanded WTP Vitrification with Supplemental Treatment**

Technologies; Landfill Closure. Alternative 5 includes retrieval of 90 percent of the waste from SSTs. WTP current configuration capacity for producing ILAW glass would be expanded and supplemented with thermal treatment capacity (bulk vitrification) and nonthermal treatment capacity (cast stone). Under this alternative, no technetium-99 removal would occur as part of WTP pretreatment; however, a sulfate removal process would allow higher waste loading in the ILAW glass. There would be separate treatment of the candidate tank mixed TRU waste as described in the *TC&WM EIS*. The SST system would be closed as a landfill and covered with an engineered Hanford barrier, a multi-layer barrier designed to provide 1,000-year protection.

- **Alternative 6: All Waste as Vitrified HLW.** Under Alternative 6, all vitrified waste produced in the WTP would be managed as immobilized HLW (IHLW). Alternative 6A includes retrieval of 99.9 percent of the waste from SSTs and vitrification in the WTP using an expanded IHLW production capacity. The SST system would be clean closed.⁴ Alternative 6B includes retrieval of 99.9 percent of the waste from SSTs, pretreatment in the WTP, separation into HLW and LAW streams, and vitrification into IHLW and ILAW glass. Both vitrified waste streams would be managed as HLW. The SST system would be clean closed. Alternative 6C includes retrieval of 99 percent of the waste from

⁴ Clean closure means the removal or remediation of all hazardous waste from a given RCRA-regulated unit so that further regulatory control under RCRA Subtitle C is not necessary to protect human health and the environment.

the SSTs. Like Alternative 6B, this waste would be pretreated in the WTP, and vitrified into IHLW and ILAW glass. Both vitrified waste streams would be managed as HLW. The SST system would be closed as a landfill and covered with an engineered modified RCRA Subtitle C barrier. Under all Tank Closure Alternative 6 sub-alternatives listed above (6A, 6B, and 6C), the resulting IHLW and ILAW glass would be stored in IHLW Interim Storage Modules and managed as IHLW pending ultimate disposition.

Fast Flux Test Facility Decommissioning

- **FFTF Alternative 1: No Action.** Under Alternative 1, the FFTF Reactor Containment Building (RCB), along with the rest of the buildings within the 400 Area Property Protected Area, would be maintained under 100 years of administrative controls (site security and management). Activities under the *Environmental Assessment, Sodium Residuals Reaction/Removal and Other Deactivation Work Activities* (DOE/EA-1547, March 2006) would be completed. The reactor vessel, piping systems, and tanks would be left in place under an inert gas blanket and Remote Handled Special Components (RH-SCs) would be stored. Spent nuclear fuel would be removed, and systems not associated with maintaining safety-related functions would be deactivated or de-energized and isolated according to the deactivation plans.
- **FFTF Alternative 2: Entombment.** Under Alternative 2, all above-grade structures around the main FFTF RCB and two adjacent support facilities would be dismantled. Demolition waste would be consolidated in below-grade spaces and stabilized with grout.

RH-SCs would be removed and treated at either Hanford or the Idaho National Laboratory (INL), and then be disposed of at Hanford in an Integrated Disposal Facility (IDF) or at the Nevada National Security Site, depending on the treatment option selected. An engineered modified RCRA Subtitle C barrier would be constructed over the filled area. For both FFTF Alternative 2 and 3 Hanford's bulk sodium inventory would be converted to a caustic sodium hydroxide solution for reuse at Hanford.

- **FFTF Alternative 3: Removal.** Under Alternative 3, all above-grade structures around the main RCB and the two adjacent support facilities would be dismantled. The RCB would be demolished to grade and the support facilities to below grade. Contaminated demolition waste would be disposed of at Hanford in an IDF. The reactor vessel, its internal piping and equipment, and its attached depleted-uranium shielding would be filled with grout, removed, packed, and disposed of in an IDF. All other radioactively contaminated equipment and hazardous materials also would be removed for disposal.

Waste Management

- **Alternative 1: No Action.** Alternative 1 evaluates continued storage of LLW, MLLW, and TRU waste at the Central Waste Complex (CWC), Waste Receiving and Processing Facility (WRAP), and T Plant in the 200-West Area, with no expanded storage capacity required. At the CWC, the LLW and MLLW would be processed for disposal in Low-Level Radioactive Waste Burial Grounds (LLBGs) Trenches 31 and 34. These trenches are the only lined trenches in the LLBGs and would receive on-site

“non-CERCLA,”⁵ non-tank LLW and MLLW until this waste stream is no longer generated. TRU waste would be shipped to and disposed of in the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico.

- **Alternative 2: Disposal in IDF, 200-East Area Only.** Alternative 2 evaluates continued storage and processing of LLW, MLLW, and TRU waste using existing and expanded capabilities at the CWC, WRAP, and T Plant. In Waste Management Alternative 2, disposal of LLW and MLLW in LLBGs Trenches 31 and 34 would continue until they are filled. Routine shipments of TRU waste for disposal at WIPP would continue. Also under Alternative 2, DOE analyzed the construction and operation of an IDF in 200-East, and the proposed River Protection Project Disposal Facility (RPPDF) would be constructed and operated in the 200 Area. The IDF-East would accept waste from tank treatment operations, onsite non-CERCLA sources, FFTF decommissioning, waste management, and MLLW and LLW from other DOE sites. Waste from tank farm cleanup operations would be disposed of in the proposed RPPDF. After closure, these disposal facilities would be covered with engineered modified RCRA Subtitle C barriers.
- **Waste Management Alternative 3: Disposal in IDF, 200-East and 200-West Areas.** Alternative 3 is similar to Alternative 2 for Waste Management, except in Alternative 3, an IDF would also be constructed and operated in the 200-West Area. IDF-East would be used for disposal of tank waste only; IDF-West would be used for disposal of on-site waste not generated from remediation activities and off-site LLW and MLLW, as well as

⁵ “Non-CERCLA” waste refers to remediation waste not regulated under the Comprehensive Environmental Restoration, Compensation and Liability Act. CERCLA waste is disposed of in the existing Environmental Restoration Disposal Facility on site.

FFTF decommissioning and waste management wastes. After closure, these disposal facilities would be covered with engineered modified RCRA Subtitle C barriers.

Environmentally Preferred Alternatives

Tank Closure

SST Closure - Clean closure is the environmentally preferred alternative when considering only long-term groundwater impacts, e.g., impacts that may be incurred during the period after closure of a facility. In terms of land resources, clean closure may allow future use of the tank system area, but, unlike all other Tank Closure alternatives, would require significant new, permanent land disturbance for new facilities to treat, store, and dispose of waste. The Tank Closure No Action alternative is the environmentally preferred alternative when considering only short-term impacts, e.g., those that may be incurred during the operational period through facility closure. Such impacts include worker dose, land disturbance, and electrical use. Clean closure of the SST system compared with landfill closure would have the following potentially adverse short-term impacts: total land commitments would increase twofold, electrical use would increase by one order of magnitude, geologic resource requirements would increase as much as fivefold, sagebrush habitat affected would increase by as much as two orders of magnitude, radiation worker population dose from normal operations would increase over twofold, LLW and MLLW generation volumes would increase threefold, and total Occupational Safety and Health Administration recordable cases would increase as much as fivefold.

FFTF

FFTF Alternative 2 Entombment and Alternative 3 Removal are both environmentally preferred. The long-term analysis shows that the inventory remaining for the two alternatives is relatively small. Results for both alternatives show the groundwater impacts for the constituents of concern to be below the maximum contaminant levels under the Safe Drinking Water Act at the fence line of the FFTF facility. Short-term impacts for the land, water, transportation and socioeconomic analysis areas would be slightly smaller for FFTF Alternative 2 Entombment. However, the air analysis and construction impacts would be slightly larger for the FFTF Alternative 2 Entombment.

Waste Management

Waste Management Alternatives 2 and 3 are both environmentally preferred. Short-term environmental impacts are projected to be very similar for these two waste management alternatives with no differences between impact areas. Long-term impacts analysis indicates that IDF-West may not perform as well as IDF-East, even when the infiltration rate is assumed to be equal for both facilities.

Preferred Alternatives

In accordance with CEQ guidance, the preferred alternative is the alternative that the agency believes would fulfill its statutory mission while giving consideration to environmental, economic, technical, and other factors. DOE identified its preferred alternative for each of the three major sets of actions evaluated in the *Final TC&WM EIS*. The preferred alternatives are identified in the *Final TC&WM EIS* Summary, Section S.7, Preferred Alternative, *TC&WM EIS*

Chapter 2, Section 2.12, and a *Federal Register* notice referenced below, and summarized in the following paragraphs.

As stated in the *Final TC&WM EIS*, for the actions related to tank waste retrieval, treatment and closure, DOE prefers Tank Closure Alternative 2B, without removing technetium in the Pretreatment Facility. Tank Closure Alternative 2B includes 99 percent retrieval of waste by volume from the SSTs; leak detection monitoring and routine maintenance; new and existing storage facilities; operations and necessary maintenance, waste transfers and associated operations, and upgrades to existing tanks or construction of waste receipt facilities. Tank waste treatment includes pretreatment of all tank waste, with separation into LAW and HLW. New evaporation capacity, upgrades to the Effluent Treatment Facility (ETF), new transfer lines and processing of both vitrified LAW and secondary waste for disposal are part of tank waste treatment. Disposal activities include disposal of LAW on site and construction of IHLW Interim Storage Modules. SST closure operations include filling the tanks and ancillary equipment with grout to immobilize the residual waste. Disposal of contaminated equipment and soil would occur on site. Decisions on the extent of soil removal or treatment, , would be made on a tank farm or waste management area basis through the RCRA closure permitting process. The tanks would be stabilized, and an engineered modified RCRA Subtitle C barrier put in place followed by post-closure care.

DOE does not have a preferred alternative regarding supplemental treatment for LAW; DOE believes it is beneficial to study further the potential cost, safety, and environmental performance of supplemental treatment technologies. When DOE is ready to identify its preferred alternative

regarding supplemental treatment for LAW, it will provide a notice of its preferred alternative in the *Federal Register*.

DOE identified its preference to consider options for retrieving, treating, and disposing of the candidate TRU waste evaluated in the *TC&WM EIS* and further clarified this preference in a *Federal Register* notice issued March 11, 2013 (78 FR 15358). As stated in that notice, DOE prefers to retrieve, treat, package, characterize and certify the wastes that are properly and legally classified as mixed TRU waste for disposal at WIPP. Initiating retrieval of tank waste for disposition as mixed TRU waste would be contingent on, among other things, DOE's obtaining the applicable and necessary permits, ensuring that the WIPP Waste Acceptance Criteria and all other applicable regulatory requirements are met, and making a determination that the waste is properly classified as mixed TRU waste. DOE is not deciding to implement its preferred or any other alternative associated with this matter in this ROD.

As stated in the *Final TC&WM EIS*, for FFTF Decommissioning, DOE's preference is for Alternative 2 Entombment, which would remove all above-grade structures, including the reactor building. Below-grade structures would remain in place and be filled with grout to immobilize the remaining radioactive and hazardous constituents, then covered with an RCRA-compliant barrier. The RH-SCs would be processed at INL and returned to Hanford, while bulk sodium inventories would be processed at Hanford for use in the WTP.

For waste management, DOE's preference is for a single IDF in 200-East; the RPPDF is also included, as are upgrades to several waste management facilities as described above. The

disposal facilities would be closed with RCRA-compliant barriers. As stated in the *Final TC&WM EIS*, DOE would continue to defer the importation of off-site waste at Hanford, at least until the WTP is operational. Any future decision to import off-site waste will be subject to appropriate NEPA review. The limitations and exemptions defined in DOE's January 6, 2006, Settlement Agreement with the State of Washington (as amended on June 5, 2008) in the case of *State of Washington v. Bodman* (Civil No. 2:03-cv-05018-AAM), will remain in place.

Public Comments on the Final TC&WM EIS

DOE received six letters regarding the *Final TC&WM EIS*, which were considered in developing this ROD. These letters were from the following organizations: Confederated Tribes and Bands of the Yakama Nation; the Nez Perce Tribe; the Oregon Department of Energy; the Hanford Advisory Board; Environmental Protection Agency Region 10; and a joint letter signed by the Natural Resource Defense Council, Hanford Challenge and Southwest Research and Information Center. Many of these comments are similar to those previously provided on the *Draft TC&WM EIS* and were discussed in the Comment Response Document of the *Final TC&WM EIS*.

The Confederated Tribes and Bands of the Yakama Nation disagreed with DOE's position on: open and unclaimed lands at Hanford; the reliance on barriers and institutional controls to reduce risk; closure of the tank farms; DOE's application and consideration of the Tribal Scenarios; and groundwater modeling. DOE recognizes the concerns with long-term site use and restrictions which may be required to protect long-term human health and the environment. DOE reviewed several closure configurations in the *TC&WM EIS* and made its decision based on

a thorough evaluation of both short-and long-term risks, technical practicability and cost. DOE evaluated three different tribal exposure scenarios in the *Final TC&WM EIS*. One represented an exposure scenario agreed to between DOE and the three Tribes (the Confederated Tribes and Bands of the Yakama Nation, the Nez Perce Tribe, and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR)) in January 2005, which was evaluated in the *Draft TC&WM EIS*. In response to public comment from the Tribes, DOE revisited two other Tribal scenarios, the Yakama Nation Exposure Scenario for Hanford Site Risk Assessment, September 2007; and the Exposure Scenario for the CTUIR Traditional Subsistence Lifeways, September 2004. With respect to Tribal concerns about groundwater modeling, such as unproductive portions of the aquifer and uncertainty in selected actions, DOE carefully considered the comments and, as a result, made appropriate changes to inventory and data reporting and presentation as described in the *Supplement Analysis of the “Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington”* (DOE/EIS-0391-SA-01, February 2012). The Yakama Nation expressed concern over unaccounted and unexplained revenue needs for supplemental technologies and future funding constraints. DOE has provided cost estimates of the alternatives evaluated in the *TC&WM EIS* (Section 2.11) to inform and support funding requests in the future. The Yakama Nation also expressed concern that there was no preferred alternative for the WTP secondary waste stream. DOE did include secondary waste streams in the Final EIS preferred alternative.

The Oregon Department of Energy expressed dissatisfaction with many of DOE’s responses in the *Final TC&WM EIS* to their comments during the public comment period on the

Draft TC&WM EIS and stated that DOE had misrepresented the comments. The dissatisfaction largely appears to be related to DOE's rejection of Oregon's proposal to analyze a new tank waste alternative. In considering Oregon's comments, DOE concluded, as acknowledged in Oregon's letter, that Oregon's proposal merely contained a different combination of very similar actions to those DOE was already analyzing in other alternatives. That is, DOE concluded that the alternatives evaluated in the *TC&WM EIS* included all of the elements in the Oregon proposal except in cases such as soil remediation beneath the tanks, remediation of cribs and trenches, and use of iron phosphate glass and fractional crystallization to remove hazardous constituents. DOE notes that remediation actions such as those for contaminated groundwater at Hanford are ongoing in accordance with CERCLA. DOE included its assumptions about the efficacy of such remediation actions in Chapter 7 and Appendix U of the *Final TC&WM EIS* for the purposes of analysis only in order to better inform specific tank-related decisions. In the *Final TC&WM EIS*, DOE explained in its response to Oregon's comment regarding iron phosphate and fractional crystallization that these technologies were not sufficiently mature for practical consideration in the evaluations. On the other hand, DOE added a number of features of the Oregon proposal to the *Final TC&WM EIS*: additional tank waste storage capacity, dry storage of cesium and strontium capsules, on-site interim storage of IHLW and the concept of risk-based decisions on tank farm closures. The letter from Oregon also included comments on Ecology's views on a number of issues, and DOE will work with Oregon and Ecology to consider Oregon's perspectives in developing tank-related strategies that are appropriately protective of health and the environment at Hanford.

EPA's comments on the *Final TC&WM EIS* included support for many aspects of DOE's preferred alternative for tank closure, accompanied by concern regarding treatment of contamination in the vadose zone and potential impacts to groundwater. EPA recommended that DOE consider including opportunities for public comment in developing a Mitigation Action Plan. EPA also expressed a need for additional NEPA analyses for a future decision on supplemental treatment of LAW. In the *Final TC&WM EIS*, DOE included changes as a result of comments received during the 185-day public comment period, including mitigation actions which could be taken. Mitigation actions, such as potential soil remediation for SST closure identified in the *Final TC&WM EIS* preferred alternative that are subject to RCRA permitting, will involve a public comment process. When DOE is ready to identify its preferred alternative regarding supplemental treatment for LAW, DOE intends to follow established NEPA regulations and guidance and conduct the appropriate NEPA review.

The Nez Perce Tribe expressed concerns regarding the NEPA process in relation to DOE policies associated with consultation and communication with the Tribes. The Nez Perce Tribe acknowledged its involvement in the EIS development process and that the Tribe offered many perspectives on the document.. The Nez Perce expressed concerns that DOE did not effectively utilize DOE's policies to consult with the Tribe, asked how DOE Order 144.1, *Department of Energy American Indian Tribal Government Interactions and Policy*, was implemented in the EIS process and expressed concern that DOE was "checking the box" during the EIS process. DOE recognizes there may be differing perspectives among the parties on the level of consultation needed for various activities. In preparing the *Final TC&WM EIS*, DOE focused on the Tribal-specific meetings and specific Tribal concerns. Information on communication and

consultation with the Nez Perce Tribe can be found in Appendix C of the *Final TC&WM EIS*, while Appendix Q and Appendix W contain information on the Tribal Scenarios analyzed. DOE agrees with the Nez Perce that the Hanford Advisory Board (HAB) was not a direct Tribal forum, but DOE believes the Board provided opportunities for discussion of the EIS on a broad range of topics, and DOE considered Tribal participation and membership on the Board to be an important element of DOE's dialogue with stakeholders.

The HAB requested that DOE not issue a ROD for 90 days to allow it time to review the final EIS. Other comments included support for a decision to build a second LAW plant and discontinue funding for bulk vitrification, cast stone and steam reforming technologies. The HAB expressed its view that supplemental waste treatment is needed to protect the groundwater and meet environmental regulations. In its tank closure preferred alternative, DOE has identified the process it will follow when it is ready to make a supplemental treatment decision. See the "Preferred Alternative" section. DOE agrees with the HAB's goals for protecting health and the environment at Hanford and will continue to work with the HAB in achieving these goals.

The Natural Resource Defense Council, Hanford Challenge and Southwest Research and Information Center submitted a joint letter regarding DOE's March 11 *Federal Register* notice of its preferred alternative related to candidate TRU tank waste. DOE will address the letter at the appropriate time, i.e., should DOE be ready to issue a ROD addressing these wastes.

Decision

This is the first in a series of RODs that DOE intends to issue pursuant to the *Final TC&WM EIS*. Decisions announced in this ROD pertain to each of the three main areas analyzed in the EIS, i.e. tank closure, FFTF, and waste management, as follows.

Tank Closure

This *TC&WM EIS* ROD amends the 1997 *TWRS EIS* ROD concerning the decision to construct the WTP. Under this *TC&WM EIS* ROD, DOE will not construct the Phase II plant described in the 1997 *TWRS* ROD due to technical and financial impracticability as analyzed in the 2001 *TWRS* Supplement Analysis.

DOE has decided to implement Tank Closure Alternative 2B, “Expanded WTP Vittrification and Landfill Closure,” without supplemental treatment at WTP and without technetium-99 removal in the WTP Pretreatment facility. Additionally, DOE is not deciding on treatment of the cesium and strontium capsules in this ROD; when DOE is ready to make a decision, it will conduct an appropriate NEPA review and notify the public.

This ROD includes decisions involving the following major activities from Tank Closure Alternative 2B: retrieval of 99 percent of the tank waste by volume; use of liquid-based retrieval systems; leak detection monitoring and routine maintenance; new waste receiver facilities, as needed; additional storage facilities for canisters; operations and necessary maintenance, waste transfers and associated operations such as use of the “hose in hose” transfer lines or installation of new transfer lines, where needed; and upgrades to existing DST and SST systems, which

includes piping and other ancillary equipment as needs are identified. Tank waste treatment includes pretreatment of all tank waste, with separation into LAW and HLW. New evaporation capacity, upgrades to the ETF, new transfer lines and processing of both vitrified LAW and secondary waste for disposal are included in this decision. Disposal activities include disposal of LAW onsite and construction of enough IHLW Interim Storage Modules to store all the IHLW generated by WTP treatment prior to disposal. SST closure operations include filling the tanks and ancillary equipment with grout to immobilize the residual waste. Disposal of contaminated equipment and soil will occur on site. The tanks will be grouted and contaminated soil may be removed. The SSTs will be landfill-closed, which means they will be stabilized, and an engineered modified RCRA Subtitle C barrier put in place followed by post-closure care.

FFTF

DOE has decided to implement FFTF Alternative 2 Entombment. The RH-SCs will have the sodium residuals removed by treatment at INL and returned to Hanford for disposal in the IDF. Bulk sodium inventories located at Hanford will be converted to caustic sodium hydroxide in a Sodium Reaction Facility at Hanford, and then stored for ultimate use in the WTP.

Waste Management

DOE has decided to implement Waste Management Alternative 2, which includes disposal of LLW and MLLW at IDF-East from tank treatment operations, waste generated from WTP and ETF operations, on-site non-CERCLA sources, FFTF decommissioning waste and on-site waste

management waste. DOE will construct and operate the RPPDF for disposal of tank closure waste, as needed. Waste management activities will include continued operations at existing facilities as well as expansion of treatment capabilities at CWC, WRAP, and T plant. DOE will defer a decision on importing waste from other DOE sites (with limited exceptions as described in the Settlement Agreement with Ecology) for disposal at Hanford at least until the WTP is operational.

Basis for the Decision

Consistent with the *TWRS EIS* ROD, DOE has determined that it is necessary to retrieve the 53 million gallons of waste from the tanks to meet regulatory requirements, avoid future long-term releases to the groundwater, and reduce health impacts to potential inadvertent intruders into the waste if administrative control were lost. DOE has determined, consistent with the current design and permit that the construction of WTP and treatment of the tank waste should proceed without technetium-99 removal in the WTP Pretreatment Facility. DOE has also determined that the tradeoffs regarding short-term impacts and resources, including worker exposure, and technical uncertainties outweigh the potential groundwater benefits that may be obtained by clean closure of the SST system. Therefore, DOE has determined landfill closure of the SST system, which would include corrective/mitigation actions that may require soil removal or treatment of the vadose zone, is a more appropriate approach for SST system closure than clean closure.

DOE will implement FFTF Alternative 2, Entombment, because this alternative fulfills the programmatic objectives for closure of the FFTF facilities, it is the more cost effective of the two alternatives, and it is also the environmentally preferred alternative. Implementation of FFTF Alternative 2 would result in very low impacts to human health and the environment.

In order to treat the tank waste in WTP and implement FFTF Alternative 2 disposal, capacity is needed for waste generated during those activities. For economic and operational efficiencies, DOE has decided to operate one IDF located in the 200-East Area, instead of two separate IDFs in 200-East and 200-West. In order to process waste generated during cleanup, upgrades to site infrastructure such as CWC, WRAP, and T plant will be implemented as cleanup progresses and needs for these upgrades are identified. The IDF disposal capacity is needed to dispose of waste from tank waste treatment and FFTF disposition activities.

Mitigation Measures

In the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement (Hanford Comprehensive Land-Use Plan EIS (DOE/EIS-0222, September 1, 1999))* DOE identified specific mitigation measures, policies, and management controls that direct land use at Hanford. DOE committed to these mitigation measures, as documented in the *Hanford Comprehensive Land-Use Plan EIS ROD (64 FR 61615 November 12, 1999)*, which were reaffirmed in the *Supplement Analysis, Hanford Comprehensive Land-Use Plan EIS (EIS-0222-SA-02, June 2, 2008)* and in the amended ROD (73 FR 55824, September 26, 2008). These mitigation

measures will continue to be implemented, as applicable, for the tank waste retrieval and treatment activities discussed in the *TC&WM EIS*. The *TC&WM EIS* did not identify any mitigation measures for the short-term resource areas that are needed in addition to those in the *Supplement Analysis, Hanford Comprehensive Land Use Plan EIS* and its amended ROD.

DOE has continued to evaluate potential mitigation measures for the contaminated soil at Hanford for several years. Most recently, DOE published the *Long-Range Deep Vadose Zone Program Plan* in October 2010. This program plan summarizes the current state of knowledge regarding deep vadose zone remediation challenges beneath the Central Plateau at Hanford and DOE's approach to solving these challenges. The challenges to implementing deep vadose zone remediation are the result of contaminant depth and spread; the presence of multiple contaminants and comingled waste chemistries; physical, chemical, and biological fate and transport mechanisms; uncertain contaminant behavior; limited availability and effectiveness of cleanup remedies; and the unknown efficacy of remediation performance over the periods and spatial scales needed for making decisions.

Nevertheless, all practicable means to avoid or minimize environmental harm for the decisions identified have been adopted. DOE will prepare and implement a Mitigation Action Plan to address long-term impact areas. Long-term mitigation measures related to SST closure will be refined and presented in the *TC&WM EIS* Mitigation Action Plan, which will be posted on the Hanford and DOE NEPA Websites identified in **ADDRESSES**. DOE will periodically revisit

and update the Mitigation Action Plan as appropriate prior to initiating actions pursuant to this ROD.

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